

INCH-POUND

MIL-DTL-26517B

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SUPERSEDING

MIL-P-26517A (USAF)

05 April 1961

DETAIL SPECIFICATION

POWER SUPPLY, TRANSFORMER-RECTIFIER, AIRCRAFT
GENERAL SPECIFICATION FOR

MIL-DTL-26517B remains inactive for new design and is no longer used, except for replacement purposes.
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This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 This specification covers general requirements for power supplies that convert power from a nominal 115/200 V, 400 Hz, alternating-current (AC) aircraft electrical system to direct-current power.

1.2 Classification. The power supplies will be of the following types and classes as specified (see 6.2):

TYPE	STYLE	DESCRIPTION
Type I	Regulated	Contains provisions for regulated output voltage and parallel operation
Type II	Non-regulated	Does not contain provisions for regulated output voltage and will depend on the inherent characteristics of the power conversion elements to maintain voltage and provide paralleling within the specified limits

CLASS	DESCRIPTION
Class A	Power supplies, which are self-cooled and designed to meet the altitude-temperature requirements of Figure 1, curve II or industry equivalent.
Class B	Power supplies which are self-cooled and designed to meet the altitude-temperature requirements of Figure 1, curve I or industry equivalent, except that the temperature at sea level will be 125° C.
Class C	Power supplies which are forced-air cooled and designed to meet the altitude-temperature requirements of Figure 1, curve I or industry equivalent, except that the temperature at sea level will be 125° C.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: WR-ALC/TILCC, 420 Second Street Suite 100, Robins AFB, GA 31098-1640 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.
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2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index for Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

QQ-P-416	Plating, Cadmium (Electrodeposited)
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DEPARTMENT OF DEFENSE

DOD-D-1000	Drawings, Engineering and Associated Lists
MIL-S-7742	Screw Threads, Standard, Optimum Selected Series, General Specification for
MIL-M-7969	Motor, Alternating Current, 400-Cycle, 115/200-Volt System, Aircraft, General Specification for
MIL-A-8625	Anodic Coatings for Aluminum and Aluminum Alloys

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-130	Identification Marking of U.S. Military Property
MIL-STD-461	Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
MIL-STD-704	Aircraft Electric Power Characteristics
MIL-STD-810	Environmental Engineering Considerations and Laboratory Tests, Test Method Standard for
MIL-STD-889	Dissimilar Metals

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Defense Automated Printing Service (DAPS), 700 Robbins Ave, Building 4D, Philadelphia, PA 19111-5094, phone (215) 697-2197 or DSN 442-5164.)

2.3 Non-Government publications. The following document forms a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents, which are DOD adopted, are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

SOCIETY OF AUTOMOTIVE ENGINEERS

SAE AMS-M-3171	Magnesium Alloy, Processes for Pretreatment and Prevention for Procurement and Prevention of Corrosion on
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(Applications for copies may be addressed to the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096-0001, phone (412) 776-4841 or FAX: (412) 776-4026)

2.4 Order of Precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated specifications, specification sheets, or MS standards), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Qualification. The power supplies furnished under this specification shall be those products which are qualified for listing on the applicable qualified products list (QPL) at the time set for opening of bids (see 4.3 and 6.3).

3.2 Selection of specifications and standards. Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with current industry standards.

3.3 Materials.

3.3.1 Fungus-proof materials. Materials that are nutrients for fungi shall not be used where it is practicable to avoid them. Where used and not hermetically sealed, they shall be treated with a fungicidal agent acceptable to the procuring activity. However, if they will be used in a hermetically sealed enclosure, fungicidal treatment will not be necessary.

3.3.2 Combustible materials. Materials that support combustion and maintain open flame after the ignition source has been removed shall not be used. High-temperature materials shall be used throughout the power supply (see 4.5.1).

3.3.3 Metals. Metals shall be of the corrosion-resistant type or suitably treated to resist corrosion due to fuels, salt spray, or atmospheric conditions that may be encountered in storage or normal service. Tests to confirm corrosion resistant metals are contained in section 4, Table I, sequence numbers 23 and 24, paragraphs 4.5.12.2 Humidity and 4.5.12.3 Salt Spray.

3.3.3.1 Dissimilar metals. Unless suitably protected against electrolytic corrosion, dissimilar metals shall not be used in intimate contact with each other. Dissimilar metals are defined in MIL-STD-889.

3.4 Design and construction. Unless otherwise specified, the power supply shall meet the requirements specified herein.

3.4.1 Components. The power supply shall consist of transformers, rectifiers, and other components, except electron tubes, necessary to meet requirements for the performance specified herein. Parallel diodes shall not be used.

3.4.2 Input current balance. The current input to each phase of the power supply shall be within 5 percent of the average value of the effective current in all phases for any condition from ¼ load to full load (see 4.5.16).

3.4.3 Voltage adjustment range (Type I only). The output voltage of the power supply shall be adjustable over the range as specified in the acquisition document (see 6.2). The adjustment control shall be readily accessible and provisions shall be made for positive locking.

3.4.4 Service life. The power supply, with the exception of the fan motor, shall be designed for a service life of at least 8,000 hours without maintenance. The fan motor, if supplied, shall have a life of at least 1,500 hours without maintenance.

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3.4.5 Cooling. The power supply shall be cooled as specified in the acquisition document (see 6.2). Fan motors, where specified, shall conform to MIL-M-7969.

3.4.5.1 Explosion-proof fan motor. The cooling-fan motor shall be an explosion-proof type which shall not be adversely affected internally nor ignite an explosive mixture outside the unit (see 4.5.12.10.1).

3.4.6 Electrical connections. Internal wiring of the unit shall be in accordance with the acquisition document (see 6.2) and shall terminate as specified therein.

3.4.7 Prevention. Accidental loosening of bolts, screws, and other connections shall be prevented by lock-washers, lock nuts, staking, or other approved methods

3.4.8 Protection. All ventilating openings shall be of such size as to prevent passage of a 5/16-inch diameter rod.

3.4.9 Reliability. The power supply shall have a minimum acceptable mean-time-between-failures (MTBF) of 450 hours demonstrated to a 90-percent confidence level (see 4.5.18).

3.5 Performance. The power supply shall be capable of operating satisfactorily under the following conditions or natural combinations thereof:

- a. Temperature-altitude in accordance with Figure 1 (see 4.5.12.7).
- b. Temperature constant at -59° C from sea level to the maximum altitude in accordance with Figure 1 (see 4.5.12.1).
- c. After prolonged storage at -65° C (see 4.5.12.1).
- d. Relative humidity up to 100 percent, including conditions wherein condensation takes place in the form of both water and frost (see 4.5.12.2).
- e. Moist fungi encountered in tropical and semitropical climates (see 4.5.12.5).
- f. Vibration incident to service use (see 4.5.12.4).
- g. Exposure to sand and dust as encountered in desert areas (see 4.5.12.6).
- h. Exposure to atmosphere containing salt-laden moisture (see 4.5.12.3).

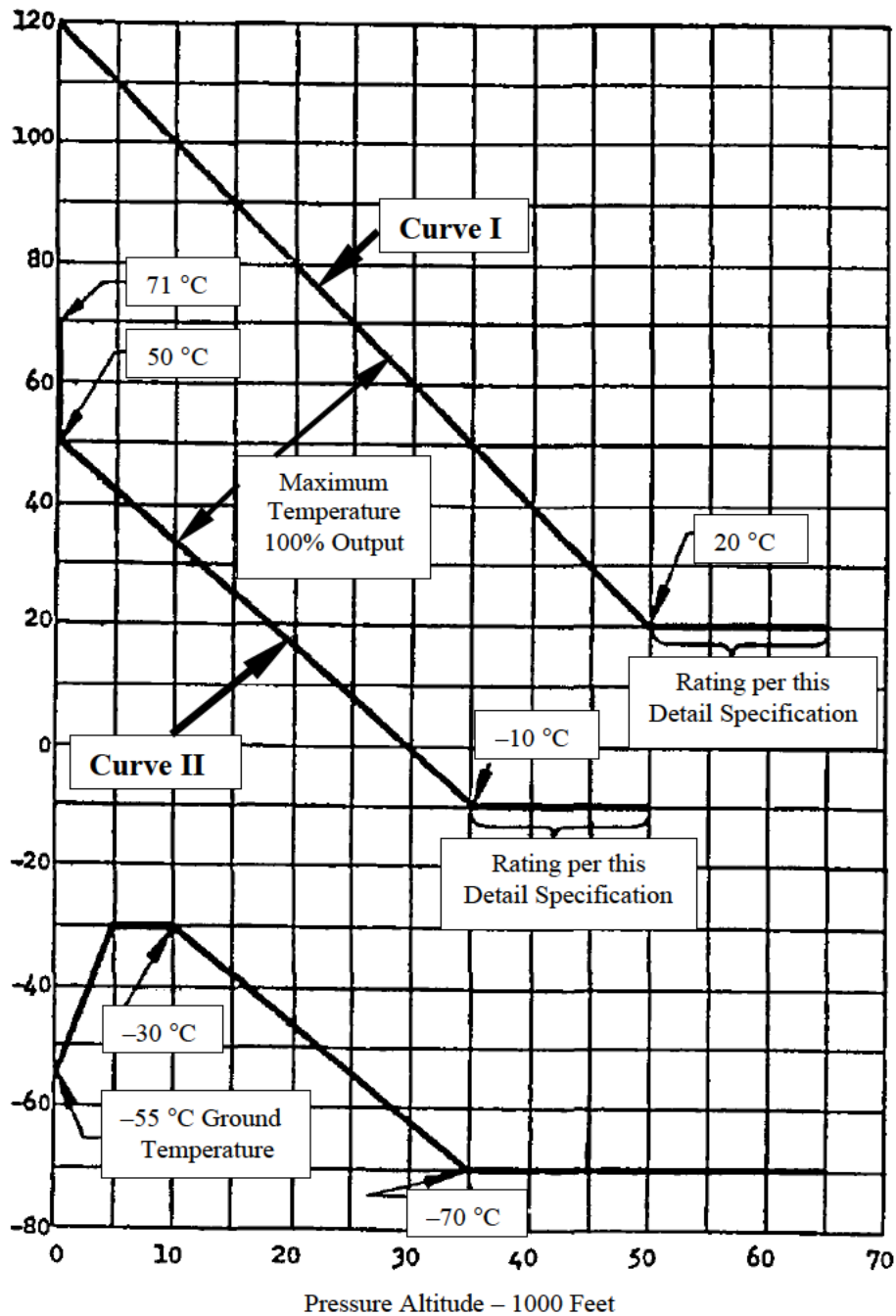
3.5.1 Input power. The power supply shall be capable of operating from an alternating current (AC) power source as specified in MIL-STD-704.

3.5.1.1 Power factor. The full-load and half-load power factors shall be not less than that as specified in the acquisition document (see 4.5.14 and 6.2).

3.5.2 Input voltage. Rated input voltage shall be 200 V. The Type-I power supply shall be designed for operation on a voltage range of 190 to 210 V.

3.5.2.1 Transient input voltage. The power supply shall be capable of withstanding a transient input of twice rated voltage for 0.1 second (see 4.5.15).

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- Minimum temperature curve is applicable to all equipment designed to either maximum temperature Curve I or II.
- Maximum temperature Curve II is applicable only for interim procurement and if specifically permitted by this detail specification.
- Test conditions per this detail specification.
- Curve I indicates the maximum temperatures to which equipment must be designed to operate satisfactorily in unconditioned compartments of high performance aircraft powered by air consuming engines.
- Curve II indicates the maximum temperatures to which equipment must be designed to operate satisfactorily in conditioned compartments of high performance aircraft or in low performance aircraft.

FIGURE 1. Altitude-temperature range.

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3.5.2.2 Output voltage. Unless otherwise specified in the acquisition document (see 6.2), the output voltage shall be in accordance with MIL-STD-704.

3.5.3 Frequency. Rated frequency shall be 400 Hertz (Hz), however, the power supply shall be designed for operation on a frequency range of 380 to 420 Hz (see 4.5.6).

3.5.4 Continuous rating. The power supply shall be capable of delivering a continuous output in accordance with the rating chart shown in the acquisition document (see 6.2).

3.5.5 Five-minute rating. The power supply shall be capable of delivering 150 percent of continuous rated current for cyclical operation of 5 minutes on and 15 minutes off for a period of 7 hours. Under this overload condition, the voltage shall not be less than that specified in the acquisition document (see 4.5.17a and 6.2).

3.5.6 One-minute rating. The power supply shall be capable of delivering 250 percent of continuous rated current for cyclical operation of 1 minute on and 18 minutes off for a period of 7 hours. Under this overload condition, the voltage shall be not less than that specified in the acquisition document (see 4.5.17b and 6.2).

3.5.7 Short-circuit capacity. The power supply shall be capable of delivering a short-circuit current of at least 500-percent rated-load current for 1 second (see 4.5.8.3).

3.5.8 Over-voltage. The power supply shall be capable of continuous operation on an input voltage of 220 V (see 4.5.13).

3.5.9 Temperature rise. The temperature rise of the components shall not exceed their breakdown limit under the temperature and altitude operating conditions shown in the acquisition document (see 4.5.12.7.1 and 6.2).

3.5.10 Voltage regulation (see 4.5.2).

3.5.10.1 Type I regulated units. The power supply shall be so designed that the output voltage will remain within the limits specified in the acquisition document (see 4.5.2.1 and 6.2) when the load on the power supply is varied from no load to full load and the input voltage and frequency are maintained within the limits of 190 to 210 V and 380 to 420 Hz (see 4.5.6). No bleeder resistor shall be connected between the direct current (DC) output terminals of the power supply.

3.5.10.2 Type II non-regulated units. The power supply shall be so designed that the output voltage will remain within the limits specified in the acquisition document (see 4.5.2.2 and 6.2) when the load on the power supply is varied from the minimum specified load to full load and the input voltage and frequency are maintained within the limits of 195 to 210 V and 380 to 420 Hz (see 4.5.6). No bleeder resistor shall be connected between the DC output terminals of the power supply.

3.5.10.2.1 No-load output voltage. At an input voltage of 210 V, the no-load output voltage of the Type II power supply shall not exceed that specified in the acquisition document (see 6.2).

3.5.11 Parallel operation.

3.5.11.1 Type I regulated units. The power supply shall be so designed that two or more units can be operated in parallel. During parallel operation, the output current and voltage shall remain within the limits specified in the acquisition document (see 6.2).

3.5.11.2 Type II non-regulated units. The power supply shall be so designed that two or more units can be operated in parallel. During parallel operation, the output voltage and current shall remain within the limits of the load division (see 4.5.7.1 and 4.5.7.2) envelope shown in the acquisition document (see 6.2) when the units are operated at rated input voltage and frequency.

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3.5.12 Efficiency. The overall efficiency shall be not less than that shown in the acquisition document (see 4.5.5 and 6.2).

3.5.13 Ripple voltage. The peak ripple in the DC output voltage shall not exceed 1.5 V (see 4.5.10).

3.5.14 Insulation. The current-carrying parts of the power supply shall be insulated from the frame. The insulation shall be capable of withstanding 1,500 V root-mean-square (rms) at commercial frequency between any terminal and the frame of the power supply (see 4.5.4).

3.5.15 Position. The power supply shall operate satisfactorily when mounted in any position, except that completely static power supplies shall conform to the requirements of the acquisition document (see 6.2).

3.6 Interchangeability. All parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable. The drawing number requirements of DOD-D-1000 shall govern changes in the manufacturer's part numbers.

3.7 Radio interference. The power supply shall meet the radio interference requirements of MIL-STD-461 (see 4.5.9).

3.8 Dimensions and weight. The dimensions and weight of the power supply shall be as specified in the acquisition document (see 6.2).

3.9 Screw threads. Unless otherwise specified, the threads of all machine screws 0.060 inch or larger in diameter shall conform to MIL-S-7742.

3.10 Finishes and protective coatings.

3.10.1 Aluminum-alloy parts. Wherever practicable, aluminum alloy parts shall be anodized in accordance with MIL-A-8625. The aluminum-oxide film formed by this treatment shall be removed from the actual contact area of all surfaces required to act as a path for electrical current and from the local areas under screws, nuts, etcetera, used for assembly or mounting purposes, to provide adequate bonding connections.

3.10.2 Magnesium-alloy parts. Wherever practicable, magnesium-alloy parts shall be surface treated in accordance with SAE AMS-M-3171 to provide protection against corrosion.

3.10.3 Plating. Cadmium plating shall be in accordance with QQ-P-416, Type II, and of a class that is adequate to achieve the degree of protection required.

3.11 Identification of product. Equipment, assemblies, and parts shall be marked for identification in accordance with MIL-STD-130. The following information shall be included:

____ A, 28 VDC
Input 200 V, 3 phase, 400 Hz
For 28 VDC system

3.12 Workmanship. The power supply, including all parts and accessories, shall be constructed and finished in a thoroughly professional manner. Particular attention shall be given to neatness and thoroughness of soldering, wiring, impregnation of coils, marking of parts and assemblies, welding and brazing, painting, riveting, machine-screw assemblies, and freedom of parts from burrs and sharp edges.

3.12.1 Screw assemblies. Assembly screws and bolts shall be tight. The word tight means that the screw or bolt cannot be appreciably tightened to exceed its clamp-load without damage, injury or stretch to the screw, bolt, or threads.

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3.12.2 Riveting. Riveting operations shall be carefully performed to insure that the rivets are tight and satisfactorily headed.

3.12.3 Cleaning. The power supply shall be thoroughly cleaned of loose, spattered, or excess solder, metal chips, and other foreign material after final assembly. Burrs and sharp edges, as well as resin flash that may crumble, shall be removed.

4. QUALITY ASSURANCE PROVISIONS

4.1 Classification of tests. The inspection and testing of the power supply shall be classified as follows:

- a. Qualification tests (see 4.3)
- b. Acceptance tests (see 4.4)

4.2 Test conditions.

4.2.1 Atmospheric conditions. Whenever the pressure and temperature existing at the time of the test are not specified definitely, the test shall be made at atmospheric pressure (approximately 29.92 inches Hg) and at room temperature of approximately 25° C. When tests are made with atmospheric pressure or room temperature differing materially from the above values, proper allowances shall be made for the difference from the specified condition.

4.3 Qualification testing.

4.3.1 Test samples. The qualification test samples shall consist of 4 complete power supply units representative of the production equipment. The samples shall be identified with the manufacturer's part number and such other information as required by the preparing activity. The samples shall be prepared as follows:

4.3.1.1 Data to accompany test samples. The test samples shall be accompanied by the following data (see 4.3.2.c):

- a. Brief operating data or instructions to enable test personnel to correctly operate the equipment.
- b. Engineering data in the form of assembly and detail drawings, wiring diagrams, et cetera.

4.3.2 Test report, test samples, and data for the procuring activity. When the tests are conducted at a location other than the laboratory of the procuring activity, the following shall be furnished to the procuring activity:

- a. Test report. Three copies of a test report.
- b. Test samples. Sample number must identify the samples, which were tested.
- c. Data. The data required under 4.3.1.1.

4.3.3. Qualification tests. Qualification tests shall consist of all tests described under 4.5, and unless otherwise specified, shall be conducted in the order specified in Table I.

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Table I. Order of qualification tests.

SEQUENCE	QUALIFICATION	PARAGRAPH	SAMPLE NUMBER			
			1	2	3	4
1	Examination of product	4.5.1	x	x	x	x
2	Voltage regulation	4.5.2	x	x	x	x
3	Insulation	4.5.4	x	x	x	x
4	Efficiency	4.5.5	x	x	x	x
5	Frequency influence	4.5.6	x	x	x	x
6	Ripple voltage	4.5.10	x	x	x	x
7	Over-voltage	4.5.13		x		
8	Power factor	4.5.14			x	
9	Transient voltage	4.5.15			x	
10	Parallel operation	4.5.7	x	x		x
11	Overload	4.5.8	x			
12	Variables affecting output voltage	4.5.3	x			
13	Radio interference	4.5.9			x	
14	Endurance	4.5.11	x			x
	Environmental	4.5.12				
15	Low temperature	4.5.12.1			x	
16	Temperature-altitude	4.5.12.7			x	
17	Shock	4.5.12.8		x		
18	Acceleration	4.5.12.9		x		
19	Explosion-proof	4.5.12.10		x		
20	Vibration	4.5.12.4			x	
21	Fungus	4.5.12.5			x	
22	Sand and dust	4.5.12.6		x	x	
23	Humidity	4.5.12.2		x		
24	Salt spray	4.5.12.3		x		

4.4 Acceptance tests. Acceptance tests shall consist of the following:

- a. Individual tests (see 4.4.1)
- b. Sampling plan and tests (see 4.4.2).

4.4.1 Individual tests. Each power supply shall be subjected to the following tests as described under 4.5:

- a. Examination of product (see 4.5.1)
- b. Voltage regulation (see 4.5.2)
- c. Insulation (see 4.5.4).

4.4.2 Sampling tests.

4.4.2.1 Sampling plan. Two power supplies shall be selected at random from each 100 or fraction thereof produced and subjected to the following tests as described under 4.5:

- a. Transient voltage (see 4.5.15)
- b. Short circuit (one time only) (see 4.5.8.3)

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- c. Efficiency (see 4.5.5)
- d. Frequency influence (see 4.5.6)
- e. Ripple voltage (see 4.5.10)
- f. Parallel operation (see 4.5.7).

4.4.2.1.1 Rejection and retest. When an item selected from a production run fails to meet the specification, no items still on-hand or later produced shall be accepted until the extent and cause of failure have been determined and appropriately corrected. The contractor shall explain to the Government representative the cause of failure and the action taken to preclude recurrence. After correction, all of the tests shall be repeated.

4.4.2.1.1.1 Individual tests may continue. For production reasons, individual tests or other sampling plans may be continued pending the investigation of a sampling test failure. But final acceptance of the entire lot or items on-hand or produced later, whichever the case may be, shall not be made until it is determined that all items meet all the requirements of the specification.

4.4.2.1.1.2 Defects in items already accepted. The investigation of a test failure could indicate that defects may exist in items already accepted. If so, the contractor shall fully advise the procurement activity of all defects likely to be found and the method of correcting them.

4.5 Test methods (see 4.3.3; 4.4.1; and 4.4.2.1).

4.5.1 Examination of product (see Table I). The power supply shall be inspected by the Quality Assurance Representative (QAR) to determine compliance with the requirements specified herein with respect to materials, workmanship, dimensions, weight, and marking. Included in this inspection is verification that all materials used are non-combustible (see 3.3.2).

4.5.2 Voltage regulation (see 3.5.10 and Table I).

4.5.2.1 Type I regulated unit. The output voltage shall be measured at zero, one-fourth, one-half, three-fourths and full-rated load at input voltages of 190, 200, and 210 V at 400 Hz. The output voltage shall remain within the limits specified in the acquisition document (see 3.5.10.1 and 6.2).

4.5.2.2 Type II non-regulated unit. The output voltage of the power supply shall be measured at no load and minimum specified load with the input held at 210 V at 400 Hz. Full-rated resistive load shall be connected and the output voltage measured with the input held at 195 V at 400 Hz. During this test, the output voltage shall remain within the limits specified in the acquisition document (see 3.5.10.2 and 6.2).

4.5.3 Variables affecting output voltage (see Table I). The output voltage shall be measured under the following conditions. For each temperature condition, the voltage shall remain within the limits specified in the acquisition document (see 6.2). For Type I regulated units, 190 VAC input shall be used in lieu of 195 VAC.

4.5.3.1 Voltage regulation at ambient temperature.

4.5.3.1.1 At 195 VAC input and 380 Hz. The load shall be varied from no load to full load. Sufficient data shall be taken to accurately plot a voltage regulation curve.

4.5.3.1.2 At 200 VAC input and 380 Hz. The test specified in 4.5.3.1.1 shall be repeated.

4.5.3.1.3 At 210 VAC input and 380 Hz. The test specified in 4.5.3.1.1 shall be repeated.

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4.5.3.1.4 At zero-output current and 380 Hz. The input voltage shall be varied gradually from 190 to 210 V and returned. The load shall not be adjusted and data need be recorded only at minimum and maximum input voltage conditions. This test shall be conducted on Type I only.

4.5.3.1.5 At 50-percent rated output current. The test specified in 4.5.3.1.4 shall be repeated (Type I only).

4.5.3.1.6 At 100-percent rated output current. The test specified in 4.5.3.1.4 shall be repeated (Type I only).

4.5.3.2 At $25^{\circ} \pm 15^{\circ}$ C with the frequency of 420 Hz. The tests specified in 4.5.3.1 through 4.5.3.1.6 shall be repeated.

4.5.3.3 Voltage regulation at low temperature. The tests specified in 4.5.3.1 and 4.5.3.2 shall be repeated at an ambient temperature of -65° C. The unit shall have been stabilized by at least 4 hours of continuous operation at this temperature at full load.

4.5.3.4 Voltage regulation at maximum temperature. The tests specified in 4.5.3.1 and 4.5.3.2 shall be repeated at an ambient temperature of 71° C for class A units, 125° C for class B and class C units. The units shall have been stabilized by at least 4 hours of continuous operation at these temperatures at full load.

4.5.4 Insulation (see Table I). A potential of 1,500 V rms commercial frequency shall be applied for 1 minute between the input terminals short-circuited together and the output terminals short-circuited together. The test shall be repeated with the 1,500 V applied between the metal enclosure and all terminals short-circuited together. The electromagnetic-interference filter capacitors shall be disconnected during this test. There shall be no insulation breakdown as a result of this test (see 3.5.14).

4.5.5 Efficiency (see Table I). With the input adjusted at 200 V and 400 Hz, the full-load efficiency of the power supply shall be measured after an initial 30-minute warm-up period. The load shall be reduced to 50-percent resistive and the efficiency measured again. The efficiency shall be not less than that shown in the acquisition document (see 3.5.12 and 6.2).

4.5.6 Frequency influence (see Table I). The output voltage of the power supply shall be measured at no load and minimum specified load with the input maintained at 210 V and 420 Hz. Full resistive load shall then be connected and the output voltage measured at an input of 195 V and 380 Hz and again at 195 V and 420 Hz (see 3.5.3). During this test, the DC output voltage shall remain within the limits specified in 3.5.10.

4.5.7 Parallel operation (see Table I).

4.5.7.1 Two power supplies. Two power supplies shall be connected to a common load and the load varied from no load to the combined rated load in 25 percent increments. Load division shall be as specified in 3.5.11. The output voltage during parallel operation shall remain within the limits shown on the acquisition document (see 6.2).

4.5.7.2 Three power supplies. Three power supplies shall be connected to a common load and the load adjusted to two-thirds of the combined rating of the 3 units (see 3.5.11.2). One unit shall be de-energized and the output voltage of the remaining units shall remain within the limits shown in the acquisition document (see 6.2).

4.5.8 Overload (see Table I).

4.5.8.1 Resistive load of 150 percent. The power supply shall be operated for 7 hours, during which time a resistive load of 150 percent is cycled for 5 minutes on and 15 minutes off, the input voltage and frequency being held at 200 V and 400 Hz. Operation shall be satisfactory and the output voltage and rectifier temperature shall not exceed the maximum allowable values for overload as specified in the acquisition document (see 6.2).

4.5.8.2 Resistive load of 250 percent. The power supply shall be operated for 7 hours during which time a resistive load of 250 percent is cycled for 1 minute on and 18 minutes off, the input voltage and frequency being

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held at 200 V and 400 Hz. Operation shall be satisfactory and output voltage and rectifier temperature shall not exceed the maximum allowable values for overload as specified in the acquisition document (see 6.2).

4.5.8.3 Short circuit. The power supply shall demonstrate its ability to deliver no less than 500 percent rated-load current under short-circuit conditions with an input voltage and frequency of 200 V and 400 Hz. The duration of the fault shall be 1 second (see 3.5.7). This test shall be repeated 3 times, and the power supply shall be allowed to return to ambient temperature before each short-circuit application. No damage shall occur as a result of this test.

4.5.9 Radio interference (see Table I). Conducted and radiated interference shall be measured at no load, half load, and full load using the test procedures and applicable test instruments specified in MIL-STD-461 (see 3.7). Either the current probe or the stabilization network procedures shall be used to measure conducted interference on the direct-current power lines. Measured interference shall be within the applicable limits of MIL-STD-461.

4.5.10 Ripple voltage (see Table I). The ripple in the DC output voltage of the power supply shall be measured at no load, one-fourth, one-half, three-fourths, and full-rated resistive loads. Voltage shall be measured with a 4-microfarad (μF) capacitor in series with a peak-reading voltmeter. Peak voltage readings shall be taken with a digital multimeter. The higher of the two readings shall not exceed 1.5 V (see 3.5.13).

4.5.11 Endurance (see Table I). The power supply shall be operated for 500 hours under the operating conditions specified in the acquisition document (see 6.2). If a motor is used, the power to the unit shall be interrupted once every 24 hours so that the motor shaft comes to rest. After the shaft has been at rest for 5 minutes, the power shall be restored and the endurance test continued. If the motor fails to start after one of the power interruptions, the power supply shall be considered to have failed the endurance test. Thermocouples shall be used to monitor the temperatures of the transformer, the rectifier, fan-motor case, and bearings (if a motor is used) for indication of maximum temperatures. Upon completion of this test, the power supply shall satisfactorily withstand the test specified in 4.5.2.

4.5.11.1 Additional endurance. If a motor is used, and upon completion of the 500-hour test specified in 4.5.11, the power supply shall be subjected to an additional 1,000 hours of operation. During this portion of the test, the transformer and rectifier elements may be electrically disconnected with only the fan motor being energized. The power to the motor shall be interrupted once every 24 hours, as specified in 4.5.11. The ambient temperature shall be such that the motor bearings will be maintained at the maximum stabilized temperature reached during the 500-hour test. There shall be no evidence of bearing deterioration and no damage to the fan-motor assembly at the conclusion of this test.

4.5.12 Environmental (see Table I). The power supply shall be subjected to the following tests in accordance with the specified procedures of MIL-STD-810.

4.5.12.1 Low temperature (see Table I). The power supply shall be subjected to low temperature in accordance with procedure II, except that the 72-hour exposure shall be at -65°C (see 3.5) and the 24-hour exposure shall be at -59°C (see 3.5). A source of 200 V, 3-phase and 400 Hz power shall be connected and the power supply operated at no-load during the final hour of the test. Operation shall be satisfactory and no damage shall occur as a result of this test.

4.5.12.2 Humidity (see Table I). The power supply shall be subjected to humidity (see 3.5) in accordance with procedure I. At the end of the test, the power supply shall show no signs of excessive corrosion and shall satisfactorily withstand the following tests in the order listed:

- a. Voltage regulation (at an ambient temperature of 25°C) (see 4.5.2)
- b. Efficiency (see 4.5.5)
- c. Ripple voltage (see 4.5.10)

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d. Insulation test using a potential of 500 V in lieu of 1,500 V (see 4.5.4).

4.5.12.3 Salt spray (see Table I). The power supply shall be subjected to salt spray for a period of 50 hours in accordance with specified procedure (see 3.5). At the end of the test, the power supply shall show no signs of excessive corrosion and shall satisfactorily withstand the tests (a, b, c, and d) listed under 4.5.12.2.

4.5.12.4 Vibration (see Table I). The power supply shall be subjected to vibration (see 3.5) in accordance with procedure XII and any additional requirements, which may be specified in the acquisition document (see 6.2). The power supply shall be operated at no load during the test.

4.5.12.4.1 Additional. After completion of the test specified in 4.5.12.4, the power supply shall show no signs of damage or loosening of parts and shall satisfactorily withstand the tests (a, b, c, and d) listed under 4.5.12.2.

4.5.12.5 Fungus (see Table I). The power supply shall be subjected to fungus (see 3.5) in accordance with procedure I. At the end of the test, the power supply shall show no appreciable growth of fungi and shall satisfactorily withstand the tests (a, b, c, and d) listed under 4.5.12.2.

4.5.12.6 Sand and dust (see Table I). The power supply shall be subjected to sand and dust (see 3.5) in accordance with procedure I. At the end of the test, the power supply shall operate satisfactorily and shall withstand the tests (a, b, c, and d) listed under 4.5.12.2.

4.5.12.7 Temperature-altitude (see Table I).. The power supply shall be subjected to altitude in accordance with procedure II, except that the altitude condition and ambient temperature shall be as specified in the acquisition document and Figure 1 (see 3.5 and 6.2). After the 1-hour period, the power supply shall be operated at this condition at rated load for a period of 7 hours.

4.5.12.7.1 Temperature rise. During the altitude test, the power supply shall also be checked for temperature rise. The temperature of the components shall not exceed their breakdown limit (see 3.5.9).

4.5.12.8 Shock (see Table I). When specified in the acquisition document (see 6.2), the power supply shall be shock tested in accordance with procedure V. At the end of the test, the unit shall operate satisfactorily and shall withstand the tests (a, b, c, and d) listed under 4.5.12.2. Damage or failure of any part of the unit during the shock test shall be cause for rejection.

4.5.12.9 Acceleration (see Table I). When specified in the acquisition document (see 6.2), the power supply shall be tested in accordance with procedure III. At the end of the test, the power supply shall operate satisfactorily and shall withstand the tests (a, b, c, and d) listed under 4.5.12.2.

4.5.12.10 Explosion-proof (see Table I). The power supply shall be tested for explosion-proof capabilities in accordance with procedure III. When operated at no load and an input of 220 V and 400 Hz, the power supply shall not ignite an explosive mixture within or outside the equipment.

4.5.12.10.1 Fan-motor. The fan motor shall be removed from the power supply and tested for explosion-proof capabilities in accordance with procedure IV. The fan-motor shall demonstrate its ability to contain an explosion (see 3.4.5.1).

4.5.13 Over-voltage (see Table I). The power supply shall be operated at rated output current for 7 hours with the input held at 220 V and 400 Hz (see 3.5.8). The temperature of the components shall not exceed the maximum critical temperature limit for rated life of the components and no damage shall occur as a result of this test.

4.5.14 Power factor (see Table I). With an input of rated voltage and frequency as specified in 3.5.2 and 3.5.3, the full-load and half-load power factors (see 3.5.1.1) of the power supply shall be measured after a warm-up period of 30 minutes. The power factors shall be not less than specified in the acquisition document (see 6.2).

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4.5.15 Transient voltage (see Table I). The power supply shall be subjected to twice-rated input voltage for 0.1 second (see 3.5.2.1). No damage shall result from this test and the power supply shall satisfactorily withstand the tests specified in 4.5.2 and 4.5.10.

4.5.16 Input Current Balance Test. Conduct test to verify that the current input to each phase of the power supply is within 5 percent of the average value of the effective current in all phases for any condition from ¼ load to full load. Record findings and submit them to become part of inspection findings in paragraph 6.2 (See 3.4.2)

4.5.17 Timed Rating Tests.

a. Five-Minute Rating Test. Conduct a test to verify that the power supply is capable of delivering 150 percent of continuous rated current for cyclical operation of 5 minutes on and 15 minutes off for a period of 7 hours. Verify that under this overload condition, the voltage is not less than that required in the acquisition document (see 6.2). Record these findings and submit them to become part of inspection findings in paragraph 6.2 (See 3.5.5).

b. One-Minute Rating Test. Conduct a test to verify that the power supply is capable of delivering 250 percent of continuous rated current for cyclical operation of 1 minute on and 18 minutes off for a period of 7 hours. Verify that under this overload condition, the voltage is not less than that required in the acquisition document (see 6.2). Record these findings and submit them to become part of inspection findings in paragraph 6.2 (See 3.5.6).

4.5.18 Reliability. If the power supply passes the qualification tests without failure, it will be considered to have met the reliability requirements specified in 3.4.9.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DOD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The power supplies covered by this specification are intended for use as devices to convert alternating-current (AC) electrical energy into direct-current (DC) electrical energy. They are intended for continuous duty on aircraft.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of the specification.
- b. Type and class of power supply desired (see 1.2).
- c. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2.1 and 2.3).
- d. Voltage adjustment range (see 3.4.3).
- e. Cooling of power supply (see 3.4.5).
- f. Electrical connections and internal wiring (see 3.4.6).

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- g. Power factors (see 3.5.1.1 and 4.6.14).
- h. Output voltage (see 3.5.2.2).
- i. Continuous rating requirements (see 3.5.4).
- j. Continuous five-minute rating (see 3.5.5 and 4.5.17a).
- k. Continuous one-minute rating (see 3.5.6 and 4.5.17b).
- l. Temperature rise under the temperature and altitude conditions (see 3.5.9 and 4.5.12.7.1).
- m. Regulated, non-regulated, and no-load output voltage regulation (see 3.5.10 and 4.5.2).
- n. Regulated and non-regulated parallel operation (see 3.5.11 and 4.5.7).
- o. Overall efficiency of the power supply (see 3.5.12 and 4.5.5).
- p. Position requirements for the static power supply (see 3.5.15).
- q. Dimensions and weight of the power supply (see 3.8).
- r. Variables affecting output voltage (see 4.5.3).
- s. Overload of the power supply (see 4.5.8).
- t. Endurance (see 4.5.11).
- u. Vibration power supply is subjected to (see 4.5.12.4).
- v. Temperature-altitude power supply is subjected to (see 4.5.12.7).
- w. Shock (see 4.5.12.8).
- x. Acceleration (see 4.5.12.9).
- y. Input current balance test (see 4.5.16).
- z. Packaging requirements (see 5.1).
- aa. Level of preservation and packaging and level of packing required (see 5.1).
- ab. Responsibility for inspection. Specify in the contract or purchase order which entity (supplier or Government) is responsible for the performance of inspection requirements, where those inspections must (or may) be performed, and any inspection rights the Government chooses to reserve in order to assure the products conform to prescribed requirements.

6.3 Qualification. With respect to products requiring qualification, awards will be made only for such products which are, at the time set for opening of bids, qualified for inclusion in the applicable Qualified Products List whether or not such products have actually been so listed by that date (see 3.1). The attention of the suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the Qualified Products List is

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ALC/TILCC, Robins AFB GA 321098-1640, and the information pertaining to qualification of products may be obtained from the activity.

6.4 Subject term (key word) listing.

Altitude
Combustible
Cooling
Frequency
Load
Parallel
Regulated
Resistive
Ripple
Vibration

6.5 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodian:
Army – AV
Navy – SH
Air Force – 99

Review Activity:

Preparing Activity:
Air Force – 84

Agent:
Air Force – 99

(Project Number 6130-0408)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7, and send to preparing activity.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-DTL-26517B	2. DOCUMENT DATE (YYYYMMDD) 16 June 2000
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3. DOCUMENT TITLE POWER SUPPLY, TRANSFORMER-RECTIFIER, AIRCRAFT GENERAL SPECIFICATION FOR

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial: (2) DSN: (3) FAX: (4) EMAIL:	7. DATE SUBMITTED (YYYYMMDD)

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